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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/890,230	01/30/2002	Peter M. Kuhn	450101-02352	9389

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EXAMINER	
AN, SHAWN S	
ART UNIT	PAPER NUMBER
2621	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/11/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/890,230	KUHN, PETER M.	
	Examiner	Art Unit	
	Shawn S. An	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5,7-27 and 29-92* is/are pending in the application.

4a) Of the above claim(s) *53-92* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5,7-27 and 29-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

1. The request filed on 3/20/07 for a Request for Continued Examination (RCE) under 37 CFR 1.114 based on parent Application No. 09/890,230 is acceptable and a RCE has been established. An action on the RCE follows.

Response to Amendment

2. As per Applicant's instructions as filed on 3/20/07, claims 1, 7, and 27 have been amended, and claims 2, 6, and 28 have been canceled.

Response to Remarks

3. Applicant's arguments with respect to amended claims as above have been carefully considered but are moot in view of the new grounds of rejection incorporating previously cited prior art references.

As per Applicant's argument regarding parsing the video/audio signals *in a compressed domain of the vide/audio signals* to extract therefrom motion vectors of the video/audio signals, DCT-coefficients, and macroblock-type, Saha et al teaches a decoder (Fig. 4, 404) for parsing the bitstream (video/audio signals) and performing VLC decoding to extract motion vectors of the video/audio signals, DCT-coefficients, and macroblock-type (col. 10, lines 20-40), which clearly seem to indicate that Saha et al is performing the claimed parsing the video/audio signals *in a compressed domain of the vide/audio signals* to extract therefrom motion vectors of the video/audio signals, DCT-coefficients, and macroblock-type all simultaneously (in one operation). Certainly, Saha et al does not teach extracting motion vectors of the video/audio signals, DCT-coefficients, and macroblock-type in pixel (non-compressed) domain of the vide/audio signals. Therefore, the best interpretation of the Saha et al's teaching as above would indicate parsing the video/audio signals *in a compressed domain of the vide/audio signals* to extract therefrom motion vectors of the video/audio signals, DCT-coefficients, and macroblock-type.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3-5, 7-27, and 29-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (5,598,216) in view of Saha et al (6,404,817 B1), Dimitrova et al (6,137,544), and Jung et al (5,978,030).

Regarding claims 1, 27, and 32, Lee discloses a video signal processing apparatus/method for processing compression encoded video signals, comprising:

extraction means for extracting at least one compressed domain feature point representing characteristics of the video/audio signals in a compressed domain of the video/audio signals (Fig. 11, 552);

means for performing motion estimation of the extracted feature points (554); and

means for tracking the feature points associated with a motion vector (Feature Point Motion Vectors) through a pre-set number of frames of the video/audio signals (Fig. 11, col. 8, lines 38-57),

wherein the extraction means calculates block relevance of all blocks in the current frame for determining a block having a high relevance as a candidate of the feature point selected as the next feature point based on the motion estimation means (col. 4, lines 53-67; col. 5, lines 1-5).

Lee also discloses extracting/parsing motion vectors (Fig. 11, see Feature Point Motion Vectors).

Lee does not particularly disclose means for parsing the video/audio signals *in a compressed domain of the vide/audio signals* to extract therefrom DCT-coefficients and macroblock-type, and using the extracted motion vectors, DCT-coefficients, and macroblock-type to extract at least one compressed domain feature point representing

characteristics of the video/audio signals in a compressed domain of the video/audio signals, calculating and extracting a block signature for the current block of high relevance as selected using part or all of DCT coefficients in a block, and calculating the block relevance of all blocks according to the DCT coefficients in the current frame.

However, a conventional decoder parsing compressed video/audio signals to extract therefrom DCT-coefficients, and macroblock-type are considered obvious features, which are necessary in decoding the compressed video/audio signals.

Further, Saha et al teaches/suggests MPEG video decoder comprising means for parsing (Fig. 4, 404) the video/audio signals *in a compressed domain of the vide/audio signals* (see Note below) to extract therefrom motion vectors of the video/audio signals, DCT-coefficients, and macroblock-type (col. 10, lines 20-40).

Note: Saha's block 404 is a bitstream decoder, which parses the bitstream (*compressed video data from block 402*), and performs VLC decoding (*which implies/indicates that decoding is performed on the compressed video data, which certainly is in a compressed domain of the vide/audio signals*) to extract therefrom motion vectors of the video/audio signals, DCT-coefficients, and macroblock-type.

Furthermore, Dimitrova et al teaches a macroblock and its relationship to a block signature comprising deriving and extracting a block signature for the current block of high relevance as selected using part of DCT (1 DC and 5 AC) coefficients in a block (Fig. 7; Fig. 6A; col. 10, lines 5-20; col. 11, lines 9-11).

Moreover, Jung et al teaches encoding a video signal using feature point based motion estimation comprising calculating a block relevance of all blocks in the current frame by using an improved feature point based on the motion compensation – DCT (coefficients) (col. 9, lines 37-52; col. 10, lines 1-49).

Therefore, it would have been obvious to a person of ordinary skill in the relevant art employing a video signal processing apparatus/method for processing compression encoded video signals as taught by Lee to incorporate the concepts as taught by Saha et al for parsing the video/audio signals to extract therefrom DCT-coefficients and macroblock-type, and using the extracted motion vectors, DCT-coefficients, and macroblock-type to extract at least one compressed domain feature point representing

characteristics of the video/audio signals in a compressed domain of the video/audio signals as a most efficient way to decode compressed video signals, and also incorporate Dimitrova's and Jung's concepts as discussed above so that the extraction means calculates and extracts the block signature for the current block of high relevance as selected using part or all of DCT coefficients in a block, wherein the extraction means calculates block relevance of all blocks according to the DCT coefficients in the current frame for determining a block having a high relevance as a candidate of the feature point selected as the next feature point based on the motion estimation means as a most efficient way to derive the block signature for the current block of high relevance and improved feature points based on the motion compensation.

Regarding claims 3-4 and 29-30, Lee discloses MC for a prediction coded macroblock (Fig. 11, 556).

Furthermore, Saha et al teaches IDCT processing (Fig. 4, 410).

Therefore, it would have been considered an obvious design choice to a person of ordinary skill in the relevant art to apply inverse transform of transforming the compressed domain to only for the blocks of high relevance selected by the metric calculation means as an efficient way to estimate motion.

Regarding claims 5 and 31, Lee discloses VOP (Figs. 5A and 5B).

Regarding claim 7 and 33, all of the claimed feature has been met as discussed above, with the exception of weighted DCT coefficients.

However, the Examiner takes official notice that utilizing weighted DCT coefficients are well known in the art for reducing set of coefficients based on the amount of noise that human eye can tolerate.

Therefore, it would have been considered obvious to a person of ordinary skill in the relevant art to calculate and extract the block signature for the current block of high relevance as selected using part or all of weighted DCT coefficients on a block as an efficient way to reduce set of DCT coefficients based on the amount of noise that human eye can tolerate.

Regarding claim 8 and 34, Lee discloses calculating the block signature for the current block of high relevance as selected in a pixel domain (col. 4, lines 63-67; col. 5, lines 1-5).

Regarding claims 9 and 35, Lee discloses means for calculating an estimated motion vector, the position of a reference block and a search area in a reference frame (col. 5, lines 16-34).

Regarding claims 10-11 and 36-37, Saha et al discloses IDCT processing (Fig. 4, 410). Therefore, it would have been considered an obvious design choice to a person of ordinary skill in the relevant art to apply inverse transform of transforming the compressed domain to all blocks in an intra-macroblock in a search area of a reference frame as an efficient way to estimate motion.

Regarding claims 12 and 38, Lee discloses MC on all blocks in a prediction coded macroblock (Fig. 11, 556).

Regarding claims 13 and 39, Lee discloses performing motion prediction for all search locations in the reference frame around the predicted motion vector for finding best motion vector, which has the lowest distance of the current block to the reference block in terms of SAD or MSE (col. 8, lines 43-57; col. 5, lines 10-34).

Regarding claims 14 and 40, it is well known in an encoding/decoding apparatus to utilize different blocks size such as 16 X 16 or 8 X 8.

Therefore, it would have been considered an obvious design choice to a person of ordinary skill in the relevant art to perform motion estimation with variable block sizes as an efficient way to estimate motion.

Regarding claims 15, 17, 41, and 43, Lee discloses a feature point location, a block signature, MV, and a block distance (col. 4, lines 63-67; col. 5, lines 1-53).

Therefore, it would have been considered obvious to a person of ordinary skill in the relevant art to save the above features for the best block positions in a reference frame as a feature point list.

Regarding claims 16 and 42, Lee discloses performing motion prediction for all search locations in the reference frame around the predicted motion vector for finding the best motion vector, which has the lowest distance of the current block to the

reference block in terms of SAD or MSE for calculating the block signature (col. 8, lines 43-57; col. 5, lines 10-34).

Saha et al teaches IDCT processing (Fig. 4, 410), and DCT processing (col. 2, lines 1-4).

Therefore, it would have been considered an obvious design choice to a person of ordinary skill in the relevant art to apply motion prediction for all search locations in the reference frame around the predicted motion vector for finding the best motion vector, which has the lowest distance of the current block to the reference block in terms of SAD or MSE for calculating the block signature in the DCT domain of the block having the best motion vector position as an efficient way to estimate motion.

Regarding claims 18 and 44, Lee discloses determining MV and block signature for all relevant current blocks (col. 5, lines 10-34).

Regarding claims 19 and 45, Lee discloses MC for a prediction coded macroblock (Fig. 11, 556), and calculating MV (Fig. 2, 212) and the prediction error (Fig. 1, 115 or 102).

Furthermore, Saha et al teaches a MPEG encoder encoding intra (I), predicted (P), and/or bidirectionally (B) predicted macroblock (col. 2, lines 15-46).

Therefore, it would have been considered obvious to a person of ordinary skill in the relevant art to calculate block relevance in the case when the current mcaro-block is an intra-type and the reference macroblock is a prediction coded macroblock, wherein the block relevance metric calculates relevance measure based on the motion vector and the prediction error energy for an associated block by taking into account the reference macroblock as an efficient way to estimate motion.

Regarding claims 20 and 46, Lee discloses calculating block relevance of all blocks in the current frame for determining a block having a high relevance as a candidate of the feature point selected as the next feature point based on the motion estimation means (col. 4, lines 53-67; col. 5, lines 1-5).

Therefore, it would have been considered an obvious design choice to a person of ordinary skill in the relevant art to set the block relevance to zero in the case when

the current mcaro-block is prediction-type macroblock and updating the list of already tracked feature points from the reference frame as an efficient way to estimate motion.

Regarding claims 21 and 47, Lee discloses MC for a prediction coded macroblock (Fig. 11, 556).

Furthermore, Saha et al teaches DCT processing (col. 2, lines 1-4).

Therefore, it would have been considered obvious to a person of ordinary skill in the relevant art to calculate block relevance in the case when the current mcaro-block is an intra-type and the reference macroblock is also intra macroblock, wherein the block relevance metric calculates relevance measure based on the DCT activity from a block in the current macroblock and on the DCT activity as found by taking into account the reference macroblock as an efficient way to estimate motion.

Regarding claims 22 and 48, Saha et al teaches video compression in accordance with MPEG1 and MPEG2 (col. 2, lines 5-13).

Regarding claims 23-26 and 49-52, since Lee discloses extracting feature points along with metadata associated with these feature points (Fig. 11, col. 8, lines 38-57), it would have been considered an obvious design choice to utilize the above concept for object motion estimation, a motion activity model for video, and/or estimating camera motion, wherein the estimated camera motion is used to facilitate a transcoding process between one compressed video representation into an other compressed video representation.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to *Shawn S. An* whose telephone number is 571-272-7324.

7. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SHAWN AN
PRIMARY EXAMINER

4/07/07